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Influence of fatigue on impulsiveness, aspiration level, performance motivation and frustration tolerance among young Romanian psychology students

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Abstract

The objective of this research is focused on how fatigue influences impulsiveness, aspiration level, performance motivation and frustration tolerance among young Romanian psychology students. Method: Participants were 60 undergraduate students at Faculty of Psychology and Educational Sciences, University of Bucharest, aged between 19 and 23 years old; Instruments: Attitudes to Work test (Vienna Test System, 2012). Findings show that fatigue influences statistically significant the performance level (t=3.99; p=0.00001<0.01) and also tolerance to frustration (t=-2.78; p=0.007<0.01) among young Romanian psychology students. These effects can be observed either on long-term or on short-term sleep deprivation (Pilcher & Huffcutt, 1996).

Keywords: aspiration level, frustration tolerance, motivation to aschieve a task, regulatoy focused theory, fatigue.

1. Theoretical framework

McClelland (1951), Atkinson (1964) and McClelland, Atkinson, Clark, & Lowell (1953) highlighted in the classic theory of achievement motivation that new achievement tasks challenge feelings associated with past task engagements. According to the regulatory focus theory, Higgins (1997; 1998) cited by Higgins et al. (2001) highlighted that all goal-directed behavior is regulated by two distinct motivational systems. Crowe & Higgins (1997) and Higgins (1997; 1998) cited by Higgins (2001), starting from the regulatory focus theory, showed that there is a match between focus concerns and the use of desire to ensure the presence of positive outcomes.

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Higgins et al. (2001), highlighted in their study that their strategic orientations toward success offer more or less success through a so called desire approach, in order to complete the task (promotion versus prevention).

Lai (2001) presented, in his research report on motivation, the self-efficacy theory (Bandura, 1982) and the findings related on self-efficacy theory about the association with the use of cognitive strategies (Pintrich & DeGroot, 1990). Furthermore, Lai (2001) showed that empirical research supports this theory, highlighting that individuals with higher self-efficacy tend to be more motivated and successful on a given task (Pintrich & DeGroot, 1990). Pintrich & DeGroot (1990) cited by Lai (2001) associated self-efficacy with the use of cognitive strategies, and they consider that self-efficacy perceptions predict achievement over actual ability levels. Vasile (2012) discuss about impulsivity from different perspectives (as a behavioral concept, or as a personality trait).

Given the studies about fatigue and its influence on performance, although there are many studies about fatigue and processing information (Broadbent, 1979; Holding, 1983, Sanders, 1998), there are only a few studies explicitly investigating the effects of mental fatigue from the perspective of executive control. For example, some studies have investigated the effects of fatigue on response planning and transitioning from one task to another, which are both considered important aspects of executive control. Lorista et al. (2000) used data behavioral and EEG effects of time spent on a task (mental fatigue) in planning tasks and switching from one task to another. EEG data from their study showed that an increased time spent on a task represents a decreasing involvement of the brain associated with executive control exercise (frontal lobes). Therefore, this result has supported initial expectations of mental fatigue effects. In their studies, fatigue has led to a number of errors resulting in an increased reaction time. However, the study did not reveal any distinct effects of fatigue in switching from one task to another.

De Jong (2000) also studied the effects of fatigue (time spent on a task) in switching from one task to another and for response planning. He investigated whether reaction time costs when switching from one task to another were due to periods in which the participants did not engage in planning responses even though they had the opportunity to do so.

2. Objectives and hypotheses

2.1. Objective

- To show how fatigue influences impulsiveness, aspiration level, performance motivation, frustration tolerance among young Romanian psychology students;

2.2. Hypotheses

- Fatigue has a statistically significant influence on Exactitude level among young Romanian psychology students during the completion of the AHA performance test;
- Fatigue has a statistically significant influence on Decisiveness among young Romanian psychology students during the completion of the AHA performance test;
- Fatigue has a statistically significant influence on Impulsivity level among young Romanian psychology students during the completion of the AHA performance test;
- Fatigue has a statistically significant influence on Performance level among young Romanian psychology students during the completion of the AHA performance test;
- Fatigue has a statistically significant influence on Aspiration level among young Romanian psychology students during the completion of the AHA performance test
- Fatigue has a statistically significant influence on Tolerance to frustration among young Romanian psychology students during the completion of the AHA performance test.

3. Method

3.1. Participants

Participants were 60 undergraduate students from the Faculty of Psychology and Educational Sciences, 30 undergraduate students were sleep deprived 24 hours and 30 undergraduate students were having their normal sleeping hours, aged between 18 and 23 years old.

3.2. Instruments

Attitudes to Work test (AHA) (Vienna Tests System, 2012). The test measures personality oriented goals traits, both the cognitive style Impulsiveness/Reflexivity and the motivational constructs of Aspiration level, Performance motivation (McClelland, 1951; Atkinson, 1964) and Frustration tolerance. The subtests of Attitude to Work together comprise an objective test battery that assesses various personality dimensions through the presentation of simple tasks.

3.3. Procedure

At the start of the test the respondent is told, in broad terms, how to work the test and is instructed "to work quickly and accurately." This statement is often repeated at appropriate time (ex: "Please make an effort and work quickly and accurately"). The test is explained to respondent step by step. The instructions for the first subtest are then given. Instructions are spread over several screens, allowing the respondent to read at his own pace. After reading each page, the respondent must press the green "Next" button to request the following page. Before starting the first subtest, the respondent must complete a practical test. Respondent presses a button to determine a movement along the field. The effect of pressing an incorrect key (ex: press the right button although the route is heading to the left) is also demonstrated (by asking the respondent to give an incorrect answer). Instructions to work "quickly and accurately" are repeated at the beginning of each subtest.

3.4. Experimental Design

The dependent variables for the Attitudes to Work test are: 1) In the subtest “Comparing surfaces“ three dimensions are calculated: Exactitude, Decisiveness and Impulsiveness/Reflexivity; 2) In the subtest “Coding symbols“ the dimensions are: Performance level, Aspiration level, Frustration tolerance, Time of maximum performance and Target discrepancy; 3) In the subtest “Differentiating figures“ Performance motivation represent the dependent variable.

The independent variable is the amount of sleep deprivation for the experimental group of undergraduate students participating in the study.

4. Results

After collecting the data, the Kolmogorov-Smirnov test was applied to verify the data distribution of the variables: Exactitude, Decisiveness, Impulsiveness/Reflexivity, Performance level, Aspiration level, Frustration tolerance and Performance motivation. According to the results ($p>0.05$), the data is normally distributed for all variables and the t-test for independent groups may be applied.

Table 1. Attitudes to Work test: Descriptive statistics, t-test value and p-value

Variables (centiles)	Number of participants for each binned group	Mean	Standard deviation	t-test value	p-value
Exactitude	control	58.36	29.76	0.15	0.87
	experimental	57.20	28.18		
Decisiveness	control	61.30	25.20	-1.64	0.10
	experimental	71.46	22.58		
Impulsivity reflexivity	control	46.80	28.54	1.42	0.16
	experimental	35.80	31.29		
Performance level	control	69.10	20.93	3.99	0.00001
	experimental	46.96	22.01		
Aspiration level	control	57.50	28.76	-0.28	0.77
	experimental	59.80	34.11		
Tolerance to frustration	control	43.60	28.45	-2.78	0.007
	experimental	62.23	23.01		

Table 1 illustrates the descriptive statistics of the dependent variables: exactitude, decisiveness, impulsivity/reflexivity, performance level, aspiration level, tolerance to frustration. The variable means are measured in percentiles. After applying the t-test for independent groups, the t-test value and the p-value for each variable from the AHA test (presented in the Experimental design chapter) can also be seen in table 1. Only two hypotheses were confirmed. The 5th hypothesis "Fatigue has a statistically significant influence on Performance level among young Romanian psychology students during the completion of the AHA performance test" has been confirmed ($t=3.99$; $p=0.00001<0.01$). The 6th hypothesis "Fatigue has a statistically significant influence on Tolerance to frustration among young Romanian psychology students during the completion of the AHA performance test" has also been confirmed ($t=-2.78$; $p=0.007<0.01$).

5. Conclusions

This research is focused on highlighting the influence of fatigue (24 hours of sleep deprivation) on personality oriented goals traits measured by the Attitudes to Work test. It measures the following variables: Impulsiveness/Reflexivity and motivational constructs of Aspiration level and Performance motivation. Findings show that fatigue has a statistically significant influence on Performance level among young Romanian psychology students ($t=3.99$; $p=0.00001<0.01$) and also has a statistically significant influence on tolerance to frustration among young Romanian psychology students ($t=-2.78$; $p=0.007<0.01$) during the completion of the AHA performance test. The importance of studying the influence of fatigue in achieving performance and frustration tolerance is highlighted by the mean differences between the control and experimental groups (table 1). Hence, the experimental sleep deprived group has a lower performance mean by a statistically significant margin than the control group ($46.96<69.10$; $p<0.01$), showing that the experimental group couldn't achieve better performances than the control group. In other words, an individual has to have a normal sleeping program to obtain a high performance. The tolerance to frustration mean is higher by a statistically significant margin for the experimental group than the control group ($62.23>43.60$; $p=0.007$). Hence a sleep deprived individual may focus his attention and compensate the sleep deprivation for 30-45 minutes in exchange for physical and emotional energy. This energy consumption, if sustained for a long period of time, may cause burnout, stress and other mental, physical and performance consequences (Harrison & Horne, 2000; Pilcher & Huffcutt, 1996; Groeger Zijistra, Dij, 2004). Furthermore Pilcher & Huffcutt (1996) found that mood is more affected by sleep deprivation than cognitive and motor performance. These effects can be observed either on long-term or on short-term sleep deprivation.

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